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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Carin Vorde

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EXAMINER

CHAN, HENG M

ART UNIT

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1795

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,991	Applicant(s) VORDE ET AL.	
	Examiner HENG M. CHAN	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 16-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 16-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Application

Applicant's amendments and remarks filed 11/20/2009 have been acknowledged. Claims 1, 21, and 22 have been amended and claims 2-15 have been canceled. Claims 1 are 16-34 are pending.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 18, 23, 28, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,976,483 to Langlet et al. (herein after Langlet I), in view of WO 99/46202 to Latypov et al.

Regarding claim 1, Langlet I teaches a method of producing a salt of dinitramidic acid (column 1, lines 4-14, 52-67), comprising:

- Nitrating an initial compound with a nitrating acid mixture, the nitrating acid mixture comprising nitric acid/sulphuric acid ($\text{HNO}_3/\text{H}_2\text{SO}_4$) to form a dinitramidic acid in an acidic reaction mixture;
- Mixing and reacting a neutralising agent with the reaction mixture, forming the salt of dinitramidic acid; and

- Precipitating the salt of dinitramidic acid from the acidic reaction mixture, which is acidic at the time of precipitation.

Langlet I suggests that the neutralizing agent can be made of a number of formulae, one of which is a salt **AX**, wherein **A** is a metal ion or a nitrogen-containing cation (column 2, lines 45-46) such as guanidium ($C(NH_2)_3^+$) (column 3, lines 21-22).

Langlet I does not expressly teach adding a guanylurea ion to the acidic reaction mixture to form the salt of guanylurea dinitramide.

Latypov et al. also relate to making dinitramide salts and teach that organic cations such as guanidine and guanylurea make their dinitramide salts especially suitable as an explosive, and as a component in propellants, explosives and pyrotechnical compositions (page 1, lines 18-20; from page 2, line 30 to page 3, line 2).

It would have been obvious to one of ordinary skill in the art at time of invention to have used a guanylurea ion in the method of Langlet I, motivated by the fact that Latypov et al. recognize that guanidine and guanylurea are chemical equivalents to make dinitramide salts and so the skilled artisan would have used guanylurea in place of guanidine in the method of Langlet I to produce guanylurea dinitramide for its desirable properties as an explosive, and as a component in propellants, explosives and pyrotechnical compositions. See MPEP § 2144.06.

Regarding claim 18, Langlet I teaches separating the dinitramide product from the acid reaction mixture (column 1, lines 4-14, 52-67).

Regarding claim 23, Langlet I teaches that a dinitramide salt, ADN, for example, can be prepared from another dinitramide salt like KDN (see column 4, lines 6).

Langlet I does not expressly teach that the guanylurea dinitramide is used as a starting material for the preparation of other dinitramide salts.

However, it would have been obvious to one of ordinary skill in the art at the time of invention to have used guanylurea dinitramide as a starting material for other dinitramide salts just as Langlet I used ADN, motivated by the fact that the skilled artisan would have appreciated using the simple ion exchange process to make other various dinitramides.

Regarding claims 28 and 33, Langlet I teaches that KDN is recovered from the aqueous solution and re-used in the production of another dinitramide salt, ADN (column 6, lines 48-53).

Langlet I does not expressly teach that the added guanylurea ion is recovered and is re-used in the production of dinitramide salts.

However, it would have been obvious to one of ordinary skill in the art at time of invention to have recovered and re-used the added guanylurea ion in the production of dinitramide salts just as was the KDN recovered and re-used by Langlet I, motivated by the fact that the skilled artisan would have appreciated recovering and reusing materials from the remaining reaction mixture in another process for economical and waste control benefits.

Regarding claim 34, Langlet I teaches that the initial compound is ammonium sulfamate (Example 7).

Claims 16, 17, 19-22, 24-27, and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,976,483 to Langlet et al. (herein after Langlet I), in view of WO 99/46202 to Latypov et al. and US 4,559,409 to Seyerl.

Regarding claims 16 and 17, Langlet I does not expressly teach that the guanylurea ion is added by cyanoguanidine being reacted by hydrolysis with the acid reaction mixture to form protonated guanylurea in situ or that the cyanoguanidine is added to the acid reaction mixture as an aqueous slurry of cyanoguanidine.

Seyerl teaches reacting dicyanodiamide (same as cyanoguanidine), in the form of a solution or suspension, with acid in an aqueous or organic-aqueous medium to form the corresponding guanylurea compound (abstract; column 1, lines 45-47; claim 1).

It would have been obvious to one of ordinary skill in the art at time of invention to have used cyanoguanidine or an aqueous slurry of cyanoguanidine to give the guanylurea ion in the process of Langlet I, motivated by the fact that Seyerl teaches that making guanylurea ion from cyanoguanidine *in situ* permits a much higher yield and purity of the corresponding guanylurea salt by comparison with previous methods (column 2, lines 33-37) and that the optimized level of guanylurea ion in the reaction mixture would help maximize the yield of the desired guanylurea dinitramide salt.

Regarding claims 21 and 22, Langlet I teaches a method of producing a salt of dinitramidic salt (column 1, lines 4-14 and 52-67), comprising:

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- Nitrating an initial compound, e.g. ammonium sulfamate (Example 7), with a nitrating acid mixture, the nitrating acid mixture comprising nitric acid/sulphuric acid ($\text{NH}_3/\text{H}_2\text{SO}_4$) to form a dinitramidic acid in an acidic reaction mixture;
- Mixing and reacting a neutralising agent with the reaction mixture, forming the salt of dinitramidic acid;
- Precipitating the salt of dinitramidic acid from the acidic reaction mixture, which is acidic at the time of precipitation; and
- Separating the precipitate from the reaction mixture.

Langlet I suggests that the neutralizing agent can be made of a number of formulae, one of which is a salt **AX**, wherein **A** is a metal ion or a nitrogen-containing cation (see column 2, lines 45-46) such as guanidium ($\text{C}(\text{NH}_2)_3^+$) (see column 3, lines 21-22).

Langlet I does not expressly teach mixing and reacting cyanoguanidine or guanylurea nitrate with the acid reaction mixture to form a guanylurea ion in the acid reaction mixture to form a precipitating salt of dinitramidic acid, guanylurea dinitramide, in the acid reaction mixture.

Latypov et al. also relate to making dinitramide salts and teach that organic cations such as guanidine and guanylurea make their dinitramide salts especially suitable as an explosive, and as a component in propellants, explosives and pyrotechnical compositions (page 1, lines 18-20; from page 2, line 30 to page 3, line 2).

It would have been obvious to one of ordinary skill in the art at time of invention to have used a guanylurea ion in place of guanidine in the method of Langlet I,

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motivated by the fact that Latypov et al. recognize that guanidine and guanylurea are chemical equivalents to make dinitramide salts and so the skilled artisan would have used guanylurea in place of guanidine in the method of Langlet I to produce guanylurea dinitramide for its desirable properties as an explosive, and as a component in propellants, explosives and pyrotechnical compositions. See MPEP § 2144.06.

Seyerl teaches reacting dicyanodiamide (same as cyanoguanidine), in the form of a solution or suspension, with acid in an aqueous or organic-aqueous medium to form the corresponding guanylurea compound (abstract; column 1, lines 45-47; claim 1).

Therefore, it would have been obvious to one of ordinary skill in the art at time of invention to have used cyanoguanidine or a guanylurea compound such as guanylurea nitrate resulting from reacting cyanoguanidine with an appropriate acid to form protonated guanylurea, which in turn makes guanylurea dinitramide, motivated by the fact that Seyerl teaches that making guanylurea ion from cyanoguanidine *in situ* permits a much higher yield and purity of the corresponding guanylurea salt by comparison with previous methods (column 2, lines 33-37) and that the optimized level of guanylurea ion in the reaction mixture would help maximize the yield of the desired guanylurea dinitramide salt.

Regarding claims 19 and 20, Langlet I teaches separating the dinitramide product from the acid reaction mixture (column 1, lines 4-14, 52-67).

Regarding claims 24-27, Langlet I teaches that a dinitramide salt, ADN, for example, can be prepared from another dinitramide salt like KDN (see column 4, lines 6).

Langlet I does not expressly teach that the guanylurea dinitramide is used as a starting material for the preparation of other dinitramide salts.

However, it would have been obvious to one of ordinary skill in the art at the time of invention to have used guanylurea dinitramide as a starting material for other dinitramide salts just as Langlet I used ADN, motivated by the fact that the skilled artisan would have appreciated using the simple ion exchange process to make other various dinitramides.

Regarding claims 29-32, Langlet I teaches that KDN is recovered from the aqueous solution and re-used in the production of another dinitramide salt, ADN (column 6, lines 48-53).

Langlet I does not expressly teach that the added guanylurea ion is recovered and is re-used in the production of dinitramide salts.

However, it would have been obvious to one of ordinary skill in the art at time of invention to have recovered and re-used the added guanylurea ion in the production of dinitramide salts just as was the KDN recovered and re-used by Langlet I, motivated by the fact that the skilled artisan would have appreciated recovering and reusing materials from the remaining reaction mixture in another process for economical and waste control benefits.

Response to Arguments

2. Applicant's arguments with respect to claims 1 and 16-34 have been considered but are moot in view of the new ground(s) of rejection.

The Examiner has cited Latypov et al. to show that guanidine and guanylurea are art recognized equivalents that serve the same purpose of acting as cation of dinitramidic acid to produce dinitramide salts especially suitable as an explosive, and as a component in propellants, explosives and pyrotechnical compositions (page 1, lines 18-20; from page 2, line 30 to page 3, line 2). This provides a strong motivation for the skilled artisan to substitute guanidine, one of the cations used by Langlet I, with guanylurea to produce the corresponding dinitramide.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HENG M. CHAN whose telephone number is (571)270-5859. The examiner can normally be reached on Monday to Friday, 9:00 am EST to 6:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer K. Michener can be reached on (571)272-1424. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer K. Michener/
Supervisory Patent Examiner, Art Unit 1795

/HENG M CHAN/
Examiner, Art Unit 1795